ORIGINAL RESEARCH PAPER

Medical Science

PREVALENCE OF CHAGAS DISEASE IN THE HUMAN POPULATION OF THE MUNICIPALITY OF SÃO JOSÉ DE ESPINHARAS-PB, BRAZIL

KEY WORDS: Chagas Disease, prevalence, population.

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ABSTRACT

The present study had as main objective to analyze the prevalence of Chagas disease in the human population of the municipality of São José de Espinharas-PB, from 2003 to 2012. The study had as an analysis unit the archives of the Patos Municipal Laboratory and the SINAN and SIAB data available in the Municipal Health Department of the Municipality. Of the 130 exams performed under medical prescription, 11 (8.5%) had positive results for *T. cruzi* with a frequency of 4.6% for females, 3.8% for males with an age range from 40 to 70 years for both sexes, and 91.6% did not have the variables identified. The mean prevalence for the SIAB was 0.17%, with an incidence of 0.04% and 0.62% for 2007 and 2012, respectively. As for the variables, a frequency of 56% was observed for males within the age group ranging from 41 to 72 and from 40 to 86 years for females, with 91% of chagasic residents living in the rural area. The SINAN did not record in its database any case of the acute form of the disease for the period. Stability can be observed in the acute cases of infection and an incidence of 0.10% of individuals in the population with Chagas disease in the chronic phase.

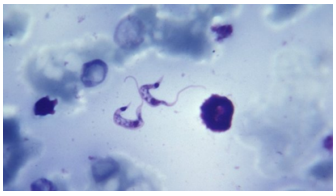
1. INTRODUCTION

The Chagas Disease or American Trypanosomiasis was discovered by Carlos Chagas in 1909 in the state of Minas Gerais. It is a zoonosis endemic in large regions of the Americas and its transmission occurs mainly by the deposition of vector (barber) feces on the skin and mucosal tissues of man (1).

The *T. cruzi* is the etiologic agent of the disease of Chagas disease (DC), and it can be seen in Figure 1. It is a flagellate protozoan of the trypanosomatid family, characterized by the presence of a flagellum and a single mitochondria (2).

Its life cycle is heterotoxous, involving a vertebrate host in which the parasite undergoes intracellular multiplication that can be the man, when the cycle occurs in domestic environment or other mammals such as: shrimp, armadillo, mocó, in the case of the cycle occurs in the wild and the insect (triatomine) where the phase of extracellular multiplication develops (3)

Figure 1 - *T. cruzi*, protozoan that causes Chagas Disease.

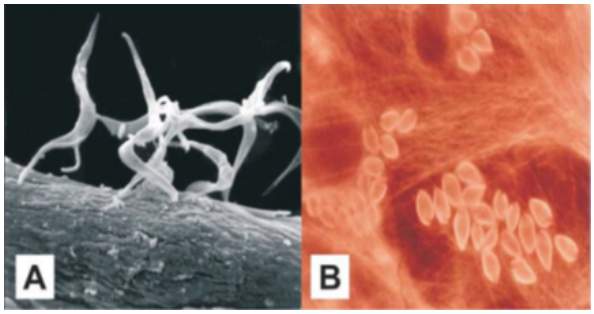


Source: VEJA, 2018.

The protozoan presents several forms during its biological cycle, which happens in the triatomines (barbers) or in diverse mammals. The forms are: spheromastigotes, epimastigotes and trypomastigotes (elongated form with kinetoplast posterior to the nucleus) developed in the insect and amastigotes forms and blood trypomastigotes in mammals (4).

Considering the natural mechanism of infection by *T. cruzi,* the protozoan presents as a trypomastigote in the blood, which is extremely mobile, and, in the tissues, as amastigotes. In the digestive tract of the insect vectors, a cycle occurs with the transformation of the parasite, that is, the protozoa multiplies and transforms into a promastigote and then into an epimastigote and consequently, in the infecting form present in the feces of the insect, metacyclic trypomastigote (5). The two main forms of the *T. cruzi* are illustrated in Figure 2a and Figure 2b.

Figure 2 - The two main forms of T. cruzi in vertebrate hosts: A- Trypomastigote; B- Amastigota.



Source: (A) Helene Barbosa, IOC/Fiocruz; (B) Mirian Claudia Pereira, IOC/Fiocruz.

For Rei (6), *T. cruzi*, because it presents many morphological, physiological and ecological variations, leads many authors to think that it is not a well defined species, but of a "cruzi complex" encompassing several entities. According to him, three groups were recently proposed in Brazil based on information from their ribosomal DNAs. A group found particularly in the Amazon region that inhabits wild and triatomine animals, which remains in the wild cycle and produce, in man, sporadic and asymptomatic infections. A second group present in the endemic areas of human disease and has as main vector *Triatoma infestans*. It is a third group of rare occurrence that causes zoonoses in wild animals, but still deserves further study on its epidemiological role.

In the last decades, the incidence of CD has shown significant reduction in several regions of the country, mainly in the northeast region. However, in a serological survey of prevalence in Brazil between 1975 and 1980, this region was the second region with the highest number of infected, with a prevalence of 3.05% in rural areas, being 4.2% the national prevalence. For the state of Paraíba prevalence was estimated at 3.48% (7).

The municipality of São José de Espinharas is located in the brazilian state of Paraíba and northeast region of Brazil, an endemic and favorable location to CD by vector transmission, considering that the majority of the population resides in rural areas, many of them living in lined habitat suitable for vector survival and scenario that contributes to the failure of prevention programs.

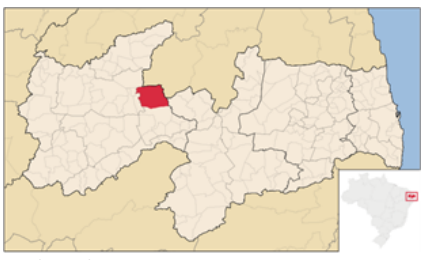
The present study aimed to analyze the prevalence of Chagas disease in the human population of the municipality of São José de Espinharas - PB, from January 2003 to December 2012.

2. MATERIAL AND METHODS

Area of Study

The study was carried out in the municipality of São José de Espinharas, as seen in Figure 3, located in the western region of the State of Paraíba, Meso-Region of Sertão Paraibano and Micro-Region of Patos, 332 km far from the state capital, João Pessoa. The municipality is well known in the universe of geology for its large uranium deposit, about 1.5 km long, remaining as a reserve for future exploration (8). With a territorial area of 726 km^2, and a population of 4,760 inhabitants (9).

Figure 3 - Location of the municipality of São José de Espinhinhas - PB.



Source: IBGE (2010).

In health, the municipality has two family health teams for low complexity care, and cases of medium and high complexity refer to Patos, Campina Grande and João Pessoa.

Data Collect

This work was characterized as an epidemiological study, with a descriptive and quantitative character, with a cross-sectional design.

The research was carried out in the archives of the Municipal Laboratory of Patos, responsible for the control of endemic diseases in 24 surrounding municipalities, among them: São José de Espinharas, located in the hemonucleus of the Regional Hospital, Deputy Jandhuy Carneiro-Patos - PB and in the database from the SINAN (Information System of Notification Diseases) and SIAB (Basic Care Information System) of the Municipal Health Department of the municipality of São José de Espinharas - PB.

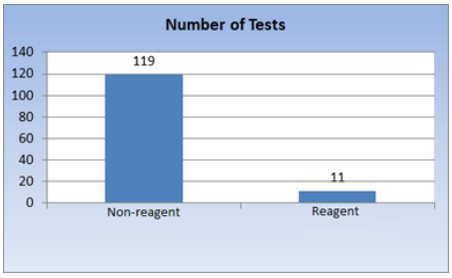
The data corresponded to the period from January 2003 to December 2012, considering gender, age group and geographical area (rural and urban) as the main variables. Demographic proportions were calculated based on the population recorded in the SIAB. The information collected was analyzed and the results submitted to the descriptive statistical analysis.

Statistical analysis was performed using Microsoft Excel software - version 2010, using absolute and percentage data, and the results will be presented in the form of graphs and tables.

RESULTS AND DISCUSSION

According to the survey carried out at the Patos Municipal Laboratory, 130 patients from the city of São José de Espinharas performed exams from January 2003 to January 2013. It was observed that of the 130 exams performed under medical prescription 11 (8.5%), had reactive serology for infection by the immunofluorescence method, seen in Figure 4.

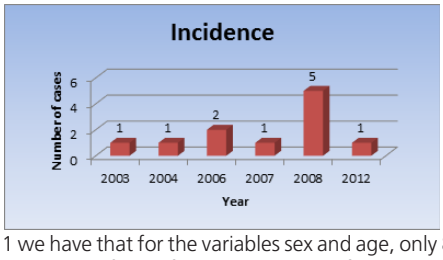
Figure 4 - Number of reagent and non-reagent tests for the period 2003 to 2012.



A similar study took place in Limeira - SP. Ré et al. (10) found in laboratory files that of the 288 cases analyzed, 9% presented reactive serology for chagas disease.

Considering the number of examinations per year, there is an average of 13 examinations per year, highlighting the year of 2008 as the year in which the population more sought the laboratory with suspicion of the disease. In all, 67 serology were performed in 2008, an average of 5.6 tests per month, illustrated in Figure 5.

Figure 5 - Distribution of reagent samples for *T. cruzi* per year.



In Table 1 we have that for the variables sex and age, only 8.4% of the total were identified. Of these, 4.6% were female with an age range ranging from 40 to 70 years for both sexes.

Table 1 - Distribution of the total number of exams performed from 2003 to 2012, according to the serology for *T. cruzi*, sex and age group of patients.

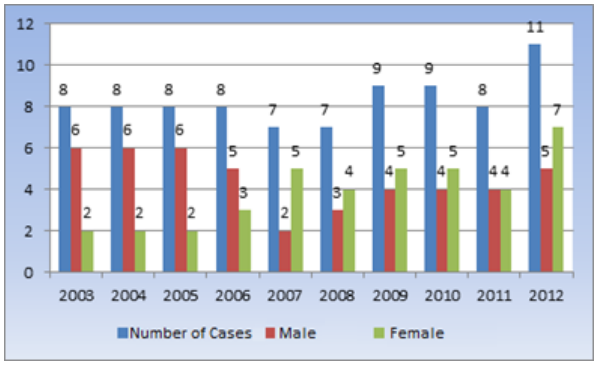
Ano	Não reagente	Reagente	Sexo			Faixa etária
			Mas	Fem	Não identificado	
2003	1	1	1	1	-	40-55
2004	1	1	1	1	-	40-72
2005	2	0	2	-	-	45-51
2006	7	2	-	-	9	-
2007	13	1	-	-	14	-
2008	62	5	-	-	67	-
2009	14	0	-	-	14	-
2010	10	0	-	-	10	-
2011	6	0	-	-	6	-
2012	3	1	-	4	-	42-56
Total	**119**	**11**	**4**	**6**	**120**	**-**

The serological prevalence observed was an average of 8.5% for the whole period (2003-2012). Considered high when compared to the prevalence of 4% revealed in 8,228 possible blood donors of the São Lucas Hospital of the Pontifical Catholic University of Rio Grande do Sul (11) and in relation to that of 1.4% confirmed in serology performed by Fonseca et al. (12) for the municipality of Salgadinho-PB. However, this prevalence is probably due to the low number of tests performed and their high positivity, since they are requested only for the purpose of confirming the infection. It was not possible to identify the geographical areas of the patients for this part of the survey, since only the municipality of residence was recorded in the records books.

According to the agency, all the reagent samples for the protozoan are of patients who present symptoms related to the chronic form of the disease, not being recorded an acute case of the disease for the municipality, confirming the SINAN municipal data, which does not identify in its database for the last ten years no case of the acute form of parasitosis for the studied population

A completely different result occurred in thirteen municipalities in the northern region of the country (Paraná, Amapá), which in one month, September 2007, reported 84 cases of acute CD by oral transmission in SINAN (13). This disproportion is attributed to the fact that acute CD by oral transmission (an important transmission route) has become increasingly frequent in the northern region, related to the consumption of food (açaí, milk) contaminated with feces or even with the infected triatomine itself. The number of cases of Chagas Disease from 2003 to 2012 in São José do Espinharas – PB can be seen in Figure 6.

Figure 6 - Distribution of the number of cases of the disease according to sex -2003 to 2012.



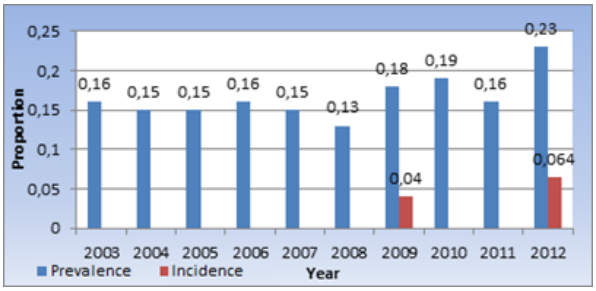
The increasing percentage of women as of 2007 may be related to the longevity or the fact that they are more concerned about health and seek more often the public health service. It can also be considered that probably all the individuals contracted the disease in the rural zone since the only existing cases in the city are of people who have spent part of their lives in the rural area.

Rural areas of 18 states of the federation including more than 2,200 municipalities were considered endemic for vector transmission in a serological survey conducted between 1975 and 1980, with a national prevalence of 4.2%. After this mapping, there was an intensification in the systematized actions of chemical control of populations domiciled of the vector, instituted from 1975 (15).

In the early 1980s, the municipality joined the campaigns to eradicate the barber that causes trypanosomiasis. Initially carried out by SUCAM (Superintendence of Public Health Campaigns), and currently by the Environmental Surveillance Program (Endemic Agents), which annually carries out surveys in all residences of the municipality, including the urban area, in order to identify the presence of the vector in the residences and, consequently, to carry out the detection, main measure in the combat to the barber. For more than 20 years the municipality still counts with the support of the Community Health Agents, who during their monthly visits do a work of awareness regarding the ways of prevention of the pathology, besides communicating to the epidemiology sector possible areas of suspicion regarding the presence of the hematophagus.

Analyzing Figure 7, a small oscillation in the prevalence of CD prevalence for the population of São José de Espinharas can be verified, with exception of 2009, which registered a growth in the prevalence of 0.05% (2 cases) and 0, 07% (3 cases) in 2013 with an incidence of 0.04 (50% male) and 0.064% (66.7% male) for the same period.

Figura 7 - Percentage of Chagas Disease prevalence and incidence - 2003 to 2012.



This results in a general average prevalence for the population of 0.17%. This value is extremely inferior to that of the serological survey carried out in Brazil between 1975 and 1980, which revealed a prevalence of 3.48% for the rural area of Paraíba, according to Dias et al. (7). Statistically close to that found by Oliveira et al (16), after analyzing a register of 7,150 people enrolled in the Family Health Program, Tranquedo Neves, in the city of Montes Claros, Minas Gerais, Brazil, found a prevalence of 1%.

This reduction was mainly due to the elimination of *T. infestans* and the realization of housing improvements considered definitive actions in the fight against vectors. However, despite the reduction in prevalence and in all efforts to combat triatomine, the municipality continues to register chronic cases of the infection, such as a case diagnosed in 2012 at the Riacho da Roça farm. The lack of attention of the population in relation to the biology cycle of the vector, together with the housing and socioeconomic conditions, can favor, according to Dias (17), the maintenance of the traditional cycle of the disease.

It was also verified that the positivity of the tests did not always change the SIAB numbers, therefore, it was concluded that the same persons were already notified or the data were not being updated according to the serological diagnosis or that the results were not conclusive for the disease.

According to the Community Health Agents of the municipality, responsible for updating the System, the increase of 3 cases in 2013 was not a mini-epidemic, but only an accurate update of the cases that had clinical and conclusive diagnoses for the chronic form of the disease.

It is noticeable that after a century of its discovery, most health programs do not see sore disease as a public health problem and that actions focus only on prevention and vector control campaigns. They forget that before their supposed epidemiological control, millions of Brazilians will contract the disease and because of lack of specialized assistance they live today with the irreparable sequelae of parasitosis, many condemned to die early, since the Ministry of Health estimates (18) is that 1% to 10% of individuals with the chronic form of the disease evolve to death.

3. CONCLUSION

In view of the results, it is possible to prove stability in the acute cases of the infection and an increase of 5 new chronic cases of the disease in the population of the municipality, resulting in an average prevalence rate of 0.17%. The active search for new cases and the correct identification of the carriers of the disease will be of

fundamental importance for the epidemiological control of the disease, as well as the effectiveness of the anti-vector measures, avoiding the risk of domiciliation of species frequently found in the region as *T. brasiliense* and *T. pseudomaculata*.

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